

SEQUENCE LISTING

<110> The University Court of the University of Glasgow

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Akopian, Aram

<120> Mutant Recombinases

<130> 056646-5024

<140> US 10/529,059

<141> 2003-09-25

<150> PCT/GB03/04169

<151> 2003-09-25

<150> GB 0222229.7

<151> 2002-09-25

<160> 32

<170> PatentIn version 3.1

<210> 1

<211> 183

<212> PRT

<213> Escherichia coli

<400> 1

Met Arg Leu Phe Gly Tyr Ala Arg Val Ser Thr Ser Gln Gln Ser Leu

1 5 10 15

Asp Ile Gln Val Arg Ala Leu Lys Asp Ala Gly Val Lys Ala Asn Arg
20 25 30

Ile Phe Thr Asp Lys Ala Ser Gly Ser Ser Ser Asp Arg Lys Gly Leu
35 40 45

Asp Leu Leu Arg Met Lys Val Glu Glu Gly Asp Val Ile Leu Val Lys
50 55 60

Lys Leu Asp Arg Leu Gly Arg Asp Thr Ala Asp Met Ile Gln Leu Ile
65 70 75 80

Lys Glu Phe Asp Ala Gln Gly Val Ser Ile Arg Phe Ile Asp Asp Gly
85 90 95

Ile Ser Thr Asp Gly Glu Met Gly Lys Met Val Val Thr Ile Leu Ser
100 105 110

Ala Val Ala Gln Ala Glu Arg Gln Arg Ile Leu Glu Arg Thr Asn Glu
115 120 125

Gly Arg Gln Glu Ala Met Ala Lys Gly Val Val Phe Gly Arg Lys Arg
130 135 140

Lys Ile Asp Arg Asp Ala Val Leu Asn Met Trp Gln Gln Gly Leu Gly
145 150 155 160

Ala Ser His Ile Ser Lys Thr Met Asn Ile Ala Arg Ser Thr Val Tyr
165 170 175

Lys Val Ile Asn Glu Ser Asn
180

<210> 2

<211> 185

<212> PRT

<213> Escherichia coli

<400> 2

Met Arg Ile Phe Gly Tyr Ala Arg Val Ser Thr Ser Gln Gln Ser Leu
1 5 10 15

Asp Ile Gln Ile Arg Ala Leu Lys Asp Ala Gly Val Lys Ala Asn Arg
20 25 30

Ile Phe Thr Asp Lys Ala Ser Gly Ser Ser Thr Asp Arg Glu Gly Leu
35 40 45

Asp Leu Leu Arg Met Lys Val Glu Glu Gly Asp Val Ile Leu Val Lys
50 55 60

Lys Leu Asp Arg Leu Gly Arg Asp Thr Ala Asp Met Ile Gln Leu Ile
65 70 75 80

Lys Glu Phe Asp Ala Gln Gly Val Ala Val Arg Phe Ile Asp Asp Gly
85 90 95

Ile Ser Thr Asp Gly Asp Met Gly Gln Met Val Val Thr Ile Leu Ser
100 105 110

Ala Val Ala Gln Ala Glu Arg Arg Arg Ile Leu Glu Arg Thr Asn Glu
115 120 125

Gly Arg Gln Glu Ala Lys Leu Lys Gly Ile Lys Phe Gly Arg Arg Arg
130 135 140

Thr Val Asp Arg Asn Val Val Leu Thr Leu His Gln Lys Gly Thr Gly
145 150 155 160

Ala Thr Glu Ile Ala His Gln Leu Ser Ile Ala Arg Ser Thr Val Tyr
165 170 175

Lys Ile Leu Glu Asp Glu Arg Ala Ser
180 185

<210> 3

<211> 186

<212> PRT

<213> Escherichia coli

<400> 3

Met Thr Gly Gln Arg Ile Gly Tyr Ile Arg Val Ser Thr Phe Asp Gln
1 5 10 15

Asn Pro Glu Arg Gln Leu Glu Gly Val Lys Val Asp Arg Ala Phe Ser
20 25 30

Asp Lys Ala Ser Gly Lys Asp Val Lys Arg Pro Gln Leu Glu Ala Leu
35 40 45

Ile Ser Phe Ala Arg Thr Gly Asp Thr Val Val Val His Ser Met Asp
50 55 60

Arg Leu Ala Arg Asn Leu Asp Asp Leu Arg Arg Ile Val Gln Thr Leu
65 70 75 80

Thr Gln Arg Gly Val His Ile Glu Phe Val Lys Glu His Leu Ser Phe
85 90 95

Thr Gly Glu Asp Ser Pro Met Ala Asn Leu Met Leu Ser Val Met Gly
100 105 110

Ala Phe Ala Glu Phe Glu Arg Ala Leu Ile Arg Glu Arg Gln Arg Glu
115 120 125

Gly Ile Ala Leu Ala Lys Gln Arg Gly Ala Tyr Arg Gly Arg Lys Lys
130 135 140

Ser Leu Ser Ser Glu Arg Ile Ala Glu Leu Arg Gln Arg Val Glu Ala
145 150 155 160

Gly Glu Gln Lys Thr Lys Leu Ala Arg Glu Phe Gly Ile Ser Arg Glu
165 170 175

Thr Leu Tyr Gln Tyr Leu Arg Thr Asp Gln
180 185

<210> 4

<211> 205

<212> PRT

<213> Streptococcus pyogenes

<400> 4

Met Ala Lys Ile Gly Tyr Ala Arg Val Ser Ser Lys Glu Gln Asn Leu
1 5 10 15

Asp Arg Gln Leu Gln Ala Leu Gln Gly Val Ser Lys Val Phe Ser Asp
20 25 30

Lys Leu Ser Gly Gln Ser Val Glu Arg Pro Gln Leu Gln Ala Met Leu
35 40 45

Asn Tyr Ile Arg Glu Gly Asp Ile Val Val Val Thr Glu Leu Asp Arg
50 55 60

Leu Gly Arg Asn Asn Lys Glu Leu Thr Glu Leu Met Asn Ala Ile Gln
65 70 75 80

Gln Lys Gly Ala Thr Leu Glu Val Leu Asn Leu Pro Ser Met Asn Gly
85 90 95

Ile Glu Asp Glu Asn Leu Arg Arg Leu Ile Asn Asn Leu Val Ile Glu
100 105 110

Leu Tyr Lys Tyr Gln Ala Glu Ser Glu Arg Lys Arg Ile Lys Glu Arg
115 120 125

Gln Ala Gln Gly Ile Glu Ile Ala Lys Ser Lys Gly Lys Phe Lys Gly
130 135 140

Arg Gln His Lys Phe Lys Glu Asn Asp Pro Arg Leu Lys His Ala Phe
145 150 155 160

Asp Leu Phe Leu Asn Gly Cys Ser Asp Lys Glu Val Glu Glu Gln Thr
165 170 175

Gly Ile Asn Arg Arg Thr Phe Arg Arg Tyr Arg Thr Arg Tyr Asn Val

180

185

190

Thr Val Asp Gln Arg Lys Asn Lys Gly Lys Arg Asp Ser
195 200 205

<210> 5

<211> 202

<212> PRT

<213> Staphylococcus aureus

<400> 5

Met Ile Ile Gly Tyr Ala Arg Val Ser Ser Leu Asp Gln Asn Leu Glu
1 5 10 15

Arg Gln Leu Glu Asn Leu Lys Thr Phe Gly Ala Glu Lys Ile Phe Thr
20 25 30

Glu Lys Gln Ser Gly Lys Ser Ile Glu Asn Arg Pro Ile Leu Gln Lys
35 40 45

Ala Leu Asn Phe Val Arg Met Gly Asp Arg Phe Ile Val Glu Ser Ile
50 55 60

Asp Arg Leu Gly Arg Asn Tyr Asn Glu Val Ile His Thr Val Asn Tyr
65 70 75 80

Leu Lys Asp Lys Glu Val Gln Leu Met Ile Thr Ser Leu Pro Met Met
85 90 95

Asn Glu Val Ile Gly Asn Pro Leu Leu Asp Lys Phe Met Lys Asp Leu
100 105 110

Ile Ile Gln Ile Leu Ala Met Val Ser Glu Gln Glu Arg Asn Glu Ser
115 120 125

Lys Arg Arg Gln Ala Gln Gly Ile Gln Val Ala Lys Glu Lys Gly Val
130 135 140

Tyr Lys Gly Arg Pro Leu Leu Tyr Ser Pro Asn Ala Lys Asp Pro Gln

145 150 155 160

Lys Arg Val Ile Tyr His Arg Val Val Glu Met Leu Glu Glu Gly Gln
165 170 175

Ala Ile Ser Lys Ile Ala Lys Glu Val Asn Ile Thr Arg Gln Thr Val
180 185 190

Tyr Arg Ile Lys His Asp Asn Gly Leu Ser
195 200

<210> 6

<211> 201

<212> PRT

<213> Xanthomonas campestris

<400> 6

Met Lys Ile Gly Tyr Ala Arg Val Ser Thr Arg Glu Gln Asn Pro Ala
1 5 10 15

Leu Gln Val Asp Ser Leu Lys Ala Ala Gly Cys Glu Arg Ile Tyr Gln
20 25 30

Asp Val Ala Ser Gly Ala Lys Thr Ala Arg Pro Ala Leu Asp Glu Leu
35 40 45

Leu Gly Gln Leu Arg Gly Gly Asp Val Leu Val Ile Trp Lys Leu Asp
50 55 60

Arg Met Gly Arg Ser Leu Lys His Leu Val Glu Leu Val Gly Ser Leu
65 70 75 80

Met Glu Arg Lys Val Gly Leu Leu Ser Leu Asn Asp Pro Ile Asp Thr
85 90 95

Thr Ser Ala Gln Gly Arg Phe Val Phe Asn Leu Phe Ala Thr Leu Ala
100 105 110

Glu Phe Glu Arg Glu Leu Ile Arg Glu Arg Thr Gln Ala Gly Leu Thr

115

120

125

Ala Ala Arg Ala Arg Gly Arg Val Gly Gly Arg Pro Lys Gly Leu Ser
130 135 140

Pro Gln Ala Glu Ala Thr Ala Leu Ala Ala Glu Thr Leu Tyr Arg Glu
145 150 155 160

Arg Lys Leu Ser Val Ala Ala Ile Ala Gln Lys Leu His Leu Ser Lys
165 170 175

Ser Thr Leu Tyr Ser Tyr Leu Arg His Arg Gly Val Glu Ile Gly Pro
180 185 190

Tyr Lys Gln Ser Ala Gln Ser Pro Ile
195 200

<210> 7

<211> 193

<212> PRT

<213> Enterobacteria phage Mu

<400> 7

Met Leu Ile Gly Tyr Val Arg Val Ser Thr Asn Asp Gln Asn Thr Asp
1 5 10 15

Leu Gln Arg Asn Ala Leu Val Cys Ala Gly Cys Glu Gln Ile Phe Glu
20 25 30

Asp Lys Leu Ser Gly Thr Arg Thr Asp Arg Pro Gly Leu Lys Arg Ala
35 40 45

Leu Lys Arg Leu Gln Lys Gly Asp Thr Leu Val Val Trp Lys Leu Asp
50 55 60

Arg Leu Gly Arg Ser Met Lys His Leu Ile Ser Leu Val Gly Glu Leu
65 70 75 80

Arg Glu Arg Gly Ile Asn Phe Arg Ser Leu Thr Asp Ser Ile Asp Thr

85

90

95

Ser Ser Ala Met Gly Arg Phe Phe Phe His Val Met Gly Ala Leu Ala
100 105 110

Glu Met Glu Arg Glu Leu Ile Ile Glu Arg Thr Met Ala Gly Leu Ala
115 120 125

Ala Ala Arg Asn Lys Gly Arg Ile Gly Gly Arg Pro Pro Lys Leu Thr
130 135 140

Lys Ala Glu Trp Glu Gln Ala Gly Arg Leu Leu Ala Gln Gly Ile Pro
145 150 155 160

Arg Lys Gln Val Ala Leu Ile Tyr Asp Val Ala Leu Ser Thr Leu Tyr
165 170 175

Lys Lys His Pro Ala Lys Arg Ala His Ile Glu Asn Asp Asp Arg Ile
180 185 190

Asn

<210> 8

<211> 190

<212> PRT

<213> Salmonella typhimurium

<400> 8

Met Ala Thr Ile Gly Tyr Ile Arg Val Ser Thr Ile Asp Gln Asn Ile
1 5 10 15

Asp Leu Gln Arg Asn Ala Leu Thr Ser Ala Asn Cys Asp Arg Ile Phe
20 25 30

Glu Asp Arg Ile Ser Gly Lys Ile Ala Asn Arg Pro Gly Leu Lys Arg
35 40 45

Ala Leu Lys Tyr Val Asn Lys Gly Asp Thr Leu Val Val Trp Lys Leu

50

55

60

Asp Arg Leu Gly Arg Ser Val Lys Asn Leu Val Ala Leu Ile Ser Glu
65 70 75 80

Leu His Glu Arg Gly Ala His Phe His Ser Leu Thr Asp Ser Ile Asp
85 90 95

Thr Ser Ser Ala Met Gly Arg Phe Phe Phe His Val Met Ser Ala Leu
100 105 110

Ala Glu Met Glu Arg Glu Leu Ile Val Glu Arg Thr Leu Ala Gly Leu
115 120 125

Ala Ala Ala Arg Ala Gln Gly Arg Leu Gly Gly Arg Pro Arg Ala Ile
130 135 140

Asn Lys His Glu Gln Glu Gln Ile Ser Arg Leu Leu Glu Lys Gly His
145 150 155 160

Pro Arg Gln Gln Leu Ala Ile Ile Phe Gly Ile Gly Val Ser Thr Leu
165 170 175

Tyr Arg Tyr Phe Pro Ala Ser Ser Ile Lys Lys Arg Met Asn
180 185 190

<210> 9

<211> 213

<212> PRT

<213> Methanococcus jannaschii

<400> 9

Met Met Ile Met Glu Arg His Tyr Thr Leu Lys Glu Ala Ser Lys Ile
1 5 10 15

Leu Gly Val Ser Ile Lys Thr Leu Gln Arg Trp Asp Lys Ala Gly Lys
20 25 30

Ile Lys Cys Ile Arg Thr Leu Gly Gly Lys Arg Arg Val Pro Glu Ser

35 40 45

Glu Ile Lys Arg Ile Leu Gly Ile Lys Asp Lys Glu Gln Arg Lys Ile
50 55 60

Ile Gly Tyr Ala Arg Val Ser Phe Asn Ala Gln Lys Asp Asp Leu Glu
65 70 75 80

Arg Gln Ile Gln Leu Ile Lys Ser Tyr Ala Glu Glu Asn Gly Trp Asp
85 90 95

Ile Gln Ile Leu Lys Asp Ile Gly Ser Gly Leu Asn Glu Lys Arg Lys
100 105 110

Asn Tyr Lys Lys Leu Leu Lys Met Val Met Asn Arg Lys Val Glu Lys
115 120 125

Val Ile Ile Ala Tyr Pro Asp Arg Leu Thr Arg Phe Gly Phe Glu Thr
130 135 140

Leu Lys Glu Phe Phe Lys Ser Tyr Gly Thr Glu Ile Val Ile Ile Asn
145 150 155 160

Lys Lys His Lys Thr Pro Gln Glu Glu Leu Val Glu Asp Leu Ile Thr
165 170 175

Ile Val Ser His Phe Ala Gly Lys Leu Tyr Gly Met His Ser His Lys
180 185 190

Tyr Lys Lys Leu Thr Lys Thr Val Lys Glu Ile Val Arg Glu Glu Asp
195 200 205

Ala Lys Glu Lys Glu
210

<210> 10

<211> 217

<212> PRT

<213> Helicobacter pylori

<400> 10

Met Asn Lys Arg Met Leu Ser Ile Gly Gln Ala Ser Lys Leu Leu Gly
1 5 10 15

Val Thr Ile Gln Thr Leu Arg Asn Trp Asp Lys Lys Asp Leu Leu Lys
20 25 30

Pro Asp Glu Leu Thr Lys Gly Gly Glu Arg Arg Tyr Lys Leu Glu Ser
35 40 45

Leu Arg Arg Ile Asn Arg Ser Ile Val Phe Asn Gln Asp Glu Leu Lys
50 55 60

Thr Ile Ala Tyr Ala Arg Val Ser Ser His Asp Gln Gln Asp Asp Leu
65 70 75 80

Ile Arg Gln Val Gln Val Leu Glu Leu Tyr Cys Ala Arg Cys Gly Phe
85 90 95

Asn Tyr Glu Val Ile Gln Asp Leu Gly Ser Gly Met Asn Tyr Tyr Lys
100 105 110

Lys Gly Leu Thr Lys Leu Leu Asn Leu Ile Leu Asp Asn Gln Val Lys
115 120 125

Arg Leu Val Leu Thr His Lys Asp Arg Leu Leu Arg Phe Gly Ala Glu
130 135 140

Leu Val Phe Ser Ile Cys Glu Ala Lys Gly Val Glu Val Val Ile Ile
145 150 155 160

Asn Lys Gly Asp Glu Asn Val Arg Phe Glu Glu Glu Leu Ala Lys Asp
165 170 175

Val Leu Glu Ile Ile Thr Val Phe Ser Ala Arg Leu Tyr Gly Ser Arg
180 185 190

Ser Lys Lys Asn Lys Lys Leu Leu Asp Glu Met Gln Glu Val Ile Thr
195 200 205

Asn Asn Val Ser Tyr Leu Asn His Ala

210

215

<210> 11

<211> 159

<212> PRT

<213> Staphylococcus aureus

<400> 11

Met Lys Gln Ala Ile Gly Tyr Leu Arg Gln Ser Thr Thr Lys Gln Gln
1 5 10 15

Ser Leu Ala Ala Gln Lys Gln Thr Ile Glu Ala Leu Ala Lys Lys His
20 25 30

Asn Ile Gln Tyr Ile Thr Phe Tyr Ser Asp Lys Gln Ser Gly Arg Thr
35 40 45

Asp Lys Arg Asn Gly Tyr Gln Gln Ile Thr Glu Leu Ile Gln Gln Gly
50 55 60

Gln Cys Asp Val Leu Cys Cys Tyr Arg Leu Asn Arg Leu His Arg Asn
65 70 75 80

Leu Lys Asn Ala Leu Lys Leu Met Lys Leu Cys Gln Lys Tyr His Val
85 90 95

His Ile Leu Ser Val His Asp Gly Tyr Phe Asp Met Asp Lys Ala Phe
100 105 110

Asp Arg Leu Lys Leu Asn Ile Phe Ile Ser Leu Ala Glu Leu Glu Ser
115 120 125

Asp Asn Ile Gly Glu Gln Val Lys Asn Gly Ile Lys Glu Lys Ala Lys
130 135 140

Gln Gly Lys Met Ile Thr Thr His Ala Pro Phe Gly Tyr His Tyr
145 150 155

<210> 12

<211> 169

<212> PRT

<213> Clostridium perfringens

<400> 12

Met	Ser	Arg	Thr	Ser	Arg	Ile	Thr	Ala	Leu	Tyr	Glu	Arg	Leu	Ser	Arg
1				5					10					15	

Asp	Asp	Asp	Leu	Thr	Gly	Glu	Ser	Asn	Ser	Ile	Thr	Asn	Gln	Lys	Lys
			20					25					30		

Tyr	Leu	Glu	Asp	Tyr	Ala	Arg	Arg	Asn	Gly	Phe	Glu	Asn	Ile	Arg	His
	35						40					45			

Phe	Thr	Asp	Asp	Gly	Phe	Ser	Gly	Val	Asn	Phe	Asn	Arg	Pro	Gly	Phe
	50					55					60				

Gln	Ser	Leu	Ile	Lys	Glu	Val	Glu	Ala	Gly	Asn	Val	Glu	Thr	Leu	Ile
65					70					75					80

Val	Lys	Asp	Met	Ser	Arg	Leu	Gly	Arg	Asn	Tyr	Leu	Gln	Val	Gly	Phe
				85					90					95	

Tyr	Thr	Glu	Val	Leu	Phe	Pro	Gln	Lys	Asn	Val	Arg	Phe	Leu	Ala	Ile
			100					105					110		

Asn	Asn	Ser	Ile	Asp	Ser	Asn	Asn	Ala	Ser	Asp	Asn	Asp	Phe	Ala	Pro
		115					120					125			

Phe	Leu	Asn	Ile	Met	Asn	Glu	Trp	Tyr	Ala	Lys	Asp	Thr	Ser	Asn	Lys
	130					135					140				

Ile	Lys	Ala	Ile	Phe	Asp	Ala	Arg	Met	Lys	Asp	Gly	Lys	Arg	Cys	Ser
145					150					155					160

Gly	Ser	Ile	Pro	Tyr	Gly	Tyr	Asn	Arg
				165				

<210> 13

<211> 166

<212> PRT

<213> Lactococcus lactis bacteriophage TP901-1

<400> 13

Met Thr Lys Lys Val Ala Ile Tyr Thr Arg Val Ser Thr Thr Asn Gln
1 5 10 15

Ala Glu Glu Gly Phe Ser Ile Asp Glu Gln Ile Asp Arg Leu Thr Lys
20 25 30

Tyr Ala Glu Ala Met Gly Trp Gln Val Ser Asp Thr Tyr Thr Asp Ala
35 40 45

Gly Phe Ser Gly Ala Lys Leu Glu Arg Pro Ala Met Gln Arg Leu Ile
50 55 60

Asn Asp Ile Glu Asn Lys Ala Phe Asp Thr Val Leu Val Tyr Lys Leu
65 70 75 80

Asp Arg Leu Ser Arg Ser Val Arg Asp Thr Leu Tyr Leu Val Lys Asp
85 90 95

Val Phe Thr Lys Asn Lys Ile Asp Phe Ile Ser Leu Asn Glu Ser Ile
100 105 110

Asp Thr Ser Ser Ala Met Gly Ser Leu Phe Leu Thr Ile Leu Ser Ala
115 120 125

Ile Asn Glu Phe Glu Arg Glu Asn Ile Lys Glu Arg Met Thr Met Gly
130 135 140

Lys Leu Gly Arg Ala Lys Ser Gly Lys Ser Met Met Trp Thr Lys Thr
145 150 155 160

Ala Phe Gly Tyr Tyr His
165

<210> 14

<211> 185

<212> PRT

<213> Bacteriophage phi-C31

<400> 14

Met Thr Gln Gly Val Val Thr Gly Val Asp Thr Tyr Ala Gly Ala Tyr
1 5 10 15

Asp Arg Gln Ser Arg Glu Arg Glu Asn Ser Ser Ala Ala Ser Pro Ala
20 25 30

Thr Gln Arg Ser Ala Asn Glu Asp Lys Ala Ala Asp Leu Gln Arg Glu
35 40 45

Val Glu Arg Asp Gly Gly Arg Phe Arg Phe Val Gly His Phe Ser Glu
50 55 60

Ala Pro Gly Thr Ser Ala Phe Gly Thr Ala Glu Arg Pro Glu Phe Glu
65 70 75 80

Arg Ile Leu Asn Glu Cys Arg Ala Gly Arg Leu Asn Met Ile Ile Val
85 90 95

Tyr Asp Val Ser Arg Phe Ser Arg Leu Lys Val Met Asp Ala Ile Pro
100 105 110

Ile Val Ser Glu Leu Leu Ala Leu Gly Val Thr Ile Val Ser Thr Gln
115 120 125

Glu Gly Val Phe Arg Gln Gly Asn Val Met Asp Leu Ile His Leu Ile
130 135 140

Met Arg Leu Asp Ala Ser His Lys Glu Ser Ser Leu Lys Ser Ala Lys
145 150 155 160

Ile Leu Asp Thr Lys Asn Leu Gln Arg Glu Leu Gly Gly Tyr Val Gly
165 170 175

Gly Lys Ala Pro Tyr Gly Phe Glu Leu

180

185

<210> 15

<211> 28

<212> DNA

<213> Artificial sequence

<220>

<223> Z-box site

<400> 15

cgttcgaaat attataaatt atcagaca

28

<210> 16

<211> 28

<212> DNA

<213> Artificial sequence

<220>

<223> Z-box site

<400> 16

tgtctgataa tttataatat ttcgaacg

28

<210> 17

<211> 11

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 17

Thr Val Asp Arg Ser Ser Asp Pro Thr Ser Gln

1 5 10

<210> 18

<211> 6

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 18

Gly Ser Gly Gly Ser Gly
1 5

<210> 19

<211> 9

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 19

Gly Ser Gly Gly Ser Gly Gly Ser Gly
1 5

<210> 20

<211> 12

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 20

Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly
1 5 10

<210> 21

<211> 7

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 21

Gly Gly Gly Ser Gly Gly Gly
1 5

<210> 22

<211> 12

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 22

Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly
1 5 10

<210> 23

<211> 13

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 23

Thr	Val	Asp	Arg	Ser	Ser	Asp	Pro	Thr	Ser	Gln	Thr	Ser
1				5					10			

<210> 24

<211> 8

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 24

Gly	Ser	Gly	Gly	Ser	Gly	Thr	Ser
1				5			

<210> 25

<211> 11

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 25

Gly	Ser	Gly	Gly	Ser	Gly	Gly	Ser	Gly	Thr	Ser
1				5					10	

<210> 26

<211> 14

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 26

Gly Ser Gly Gly Ser Gly Gly Ser Gly Gly Ser Gly Thr Ser
1 5 10

<210> 27

<211> 9

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 27

Gly Gly Gly Ser Gly Gly Gly Thr Ser
1 5

<210> 28

<211> 14

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 28

Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Thr Ser
1 5 10

<210> 29

<211> 12

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 29

Asn	Arg	Val	Ala	Gln	Gln	Leu	Ala	Gly	Lys	Gln	Ser
1				5					10		

<210> 30

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 30

Ser	Asp	Tyr	Thr	Gln	Asn	Asn	Ile	His	Pro
1				5					10

<210> 31

<211> 6

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<400> 31

Thr Val Asp Arg Thr Ser

1

5

<210> 32

<211> 10

<212> PRT

<213> Artificial sequence

<220>

<223> Linker sequence

<220>

<221> MISC_FEATURE

<222> (10)..(10)

<223> Xaa is disclosed as "O"

<400> 32

Ser	Asp	Tyr	Thr	Gln	Asn	Asn	Ile	His	Xaa
1				5					10